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An Intelligence Assessment

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# **Egypt: Aspirations for Missile Production**

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**An Intelligence Assessment**

This paper was prepared by [ ] Office of  
Near Eastern and South Asian Analysis, with a  
contribution from [ ] Office of  
Scientific and Weapons Research. It was coordinated  
with the Directorate of Operations. [ ]

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Comments and queries are welcome and may be  
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**Egypt: Aspirations  
for Missile Production**

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**Key Judgments***Information available  
as of 13 April 1988  
was used in this report.*

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Cairo has made the development and production of ballistic missiles a high priority in its defense planning.

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The missile program encompasses at least two surface-to-surface ballistic missile projects:

- The Egyptians are working on a Scud-like missile, most likely based on a North Korean-engineered copy of a 300-kilometer-range Soviet Scud. They have test-fired this missile and, with North Korean assistance, could begin series production next year. The military may be attempting to modify some of the Scud-like missiles to extend their maximum range.
- The Ministry of Defense is trying, as part of a joint program with Argentina, to produce a new missile, which it will call the Vector. This missile is similar or identical to Argentina's Condor II missile and probably will have a range of some 750 to 1,000 kilometers. Egypt could begin series production of Vector missiles in the early 1990s.

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Egypt's current surface-to-surface missile capabilities are extremely limited. Cairo appears to be focusing on its missile program to boost its military's prestige and to keep pace with other states in the region—especially Libya and Israel—that are pursuing their own missile development and production projects.

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The Ministry of Defense wants the technology to produce ballistic missiles, rather than simply buy them, to avoid dependence on foreign suppliers and because it believes the technological expertise acquired through the ballistic missile program will contribute to Egypt's effort to expand its defense industries. It will try to export missiles.

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The Iraqis probably are providing most of the funding for Egypt's Condor II/Vector development program and may be involved in the Scud project as well.

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The Egyptians are slowly building their development and production capabilities, but the missile program will continue to depend on foreign expertise and foreign funding. Restrictions in the transfer of Western technology to Argentina and Egypt or, less likely, from North Korea to Egypt or a reduction in Iraqi financing probably would set back but not halt Cairo's missile program. [REDACTED]

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Additional Scud and Condor II/Vector missiles will substantially enhance Cairo's deterrent and retaliatory capabilities. Cairo probably would use the missiles during another war to try to achieve tactical goals. It also might use the missiles to strike strategic targets but would do so, particularly in the case of Israel, only in retaliation for attacks or to avoid defeat. [REDACTED]

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Egypt's acquisition of the Scuds and Condor II/Vectors and related missile production technology will contribute to missile proliferation in the region and spur other countries with less advanced missile capabilities—Libya, for example—to keep up with Cairo by accelerating their own missile procurement and development programs [REDACTED]

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[REDACTED] the Egyptians, with the Condor II/Vector, will have the second-longest-range system of any Arab state in the Middle East. [REDACTED]

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The Israelis will continue to be concerned about Saudi and Egyptian capabilities and the likely spread of missiles to other Arab countries, especially Iraq. Tel Aviv could respond to Egyptian progress in missile production by speeding its own ballistic missile research and development efforts and urging the United States to increase pressure on Arab states to halt the proliferation of missiles. [REDACTED]

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A direct US confrontation of Egypt with evidence of its involvement in missile development probably would result in Egyptian denials, temporarily strained relations with Cairo, and a brief slowing of the program to tighten access to information on the program's progress. [REDACTED]

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**Contents**

	<i>Page</i>
Key Judgments	iii
Scope Note	vii
Desire for New Missiles	1
Desire for Missile Production Technology	5
Production Capabilities	5
Development Program	7
Scud Project	12
Condor II/Vector Project	14
Iraqi Involvement in Egyptian Missile Projects	16
Dependence on Foreign Assistance	18
Outlook	19
Implications for the Region and the United States	19

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**Scope Note**

This assessment focuses on Egypt's surface-to-surface ballistic missile development and production program and on related questions concerning technology transfer and Egyptian goals.

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## Egypt: Aspirations for Missile Production

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Despite unsuccessful efforts in the 1960s, Cairo renewed its search for technology to develop short-range ballistic missiles in the late 1970s and has again made development and production of surface-to-surface missiles a high priority in its defense planning. A new program calls for Egyptian production of several types of surface-to-surface missiles by the mid-1990s, [ ]

countries. Israeli efforts to develop longer range surface-to-surface missile systems also trouble Cairo. The Israelis have flight-tested two new surface-to-surface missiles, both with ranges of at least 600 kilometers. The Egyptians undoubtedly worry about Israeli conflicts with other Arab states and, though Cairo wants to abide by its peace treaty with Tel Aviv, the potential for Egyptian involvement. [ ]

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[ ] We suspect Cairo's primary aim is to obtain a powerful deterrent against other states in the region—particularly Libya and Israel—that are pursuing their own missile development and production projects. [ ]

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### Desire for New Missiles

Egypt's current surface-to-surface missile capabilities are extremely limited. [ ]

[ ] it acquired about 70 Scud-Bs and 40 FROGs from the Soviets before Cairo broke relations with Moscow in the early 1970s. Some of these missiles were used in the Arab-Israeli war in 1973, and a small number probably have been sold to Iraq over the past eight years. The number of missiles remaining operational probably is less than 50, [ ]

The Egyptians probably view the acquisition of additional Scuds, FROGs, and more capable missiles as a feasible deterrent to aggression by Egypt's neighbors and as necessary to counter the development of missiles by other regional states. In our judgment, countries in the Middle East would find it nearly impossible to defend against missiles once they were launched, and the Ministry of Defense probably believes the threat of possible Egyptian retaliation would make other countries reluctant to strike Egypt. In particular, the Egyptian military appears to be seeking a way to discourage possible Israeli aggression and to respond to Libyan operations without committing large numbers of forces. Nonetheless, Egypt would act cautiously in using such weapons to strike enemy strategic targets, especially in the case of Israel. Even though the missiles Cairo acquires are likely to be inaccurate, the military will count on them to weaken the military and civilian morale of their enemies as well as to disrupt military activity behind enemy lines. The Egyptians probably are convinced of the value of surface-to-surface missiles as psychological weapons from their observations of the effects of Scuds used in the Iran-Iraq war. [ ]

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Cairo probably worries about missile proliferation in the Middle East and sees its missile capabilities shrinking when compared with those of other military forces in the region. In addition to fielding missiles with shorter ranges, Syria, Iraq, Iran, Libya, and South Yemen already have Scuds.<sup>1</sup> The Egyptians are especially concerned about Libya's missile development program and anticipate Soviet deliveries of new, more capable missiles to Libya, Syria, and other Arab

The military may also regard acquisition of new surface-to-surface missiles as essential to maintain its prestige in the region. We believe it sees itself as a leading force there—especially after regaining its honor in the 1973 war—and is reluctant to fall behind its neighbors in securing new technology. [ ]

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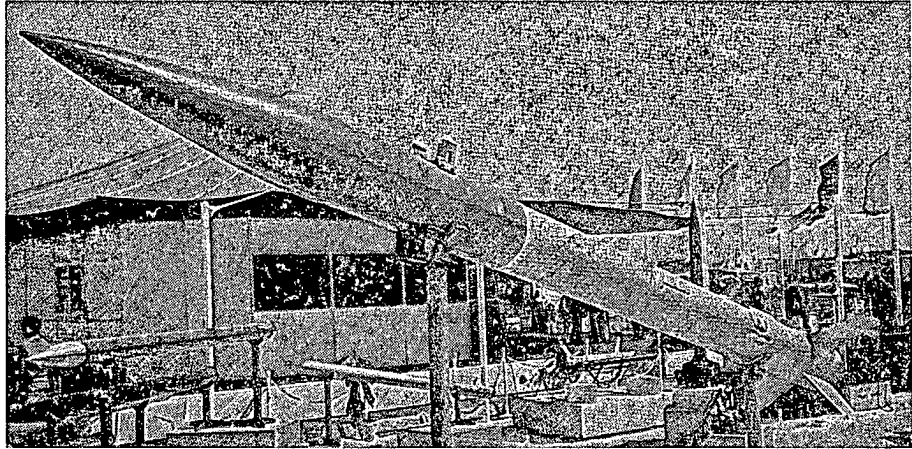
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Figure 1. Sakr-80 rocket. The Egyptians exhibited this FROG-like system at their defense show in Cairo in November 1987. The Sakr-80 is an unguided rocket with a range of 30 to 60 kilometers. [redacted]



### Desire for Missile Production Technology

Cairo wants the technology to produce ballistic missiles rather than buy them, [redacted]

[redacted] As is the case with other weapons, the Egyptians probably fear dependence on foreign suppliers and are willing to pay high initial costs to produce their own missiles. We suspect the scarcity of reliable suppliers of surface-to-surface missiles and Western efforts to restrict transfers of missiles and related technology are reinforcing the Egyptians' commitment to indigenous production. Moreover, Cairo probably hopes technology acquired through the missile program will help establish a technological and industrial base that will benefit other parts of Egypt's defense industries. [redacted]

[redacted] Cairo intends to earn needed foreign exchange by selling missiles and possibly guidance and other missile technology [redacted]

Egypt has been seeking to produce surface-to-surface missiles since the 1950s. Financial difficulties, higher priorities for other projects, and interruptions of research by war have caused temporary setbacks. Several missile programs begun in the 1960s—the Victor, Conqueror, and Pioneer—met with little success and were canceled after the Arab-Israeli war in 1967. Nonetheless, Cairo's interest in missile development and production intensified in the late 1970s, when peace with Israel enabled it to redirect resources and

the Arab Organization for Industrialization offered the prospect of increased funding and cooperation with Western firms.<sup>3</sup> [redacted]

### Production Capabilities

A series of joint ventures and contracts with Western firms has enabled the Egyptians to make gradual progress in building their missile production capabilities since the late 1970s, but their output is limited to smaller scale rockets and missiles. [redacted]

[redacted] is producing RPG-7 antitank rockets, 122-mm light artillery rockets, target rockets, smoke-generating rockets, and Sakr-eye surface-to-air missiles (reverse-engineered SA-7s). The Egyptians also have developed a prototype of a FROG-like weapon, called the Sakr-80. [redacted]

<sup>3</sup> The Arab Organization for Industrialization (AOI) was formally established in 1975 when Saudi Arabia, Kuwait, Qatar, and the United Arab Emirates provided about \$2 billion to start an Arab military industry based in Egypt. Cairo contributed manpower and four arms factories that could produce aircraft, armor, munitions, and engines. Egypt's peace treaty with Israel resulted in the withdrawal of Arab funding from AOI, but Cairo has been operating the AOI on its own, relying on foreign credits and money from arms exports. With the gradual warming of relations with the Gulf states, Cairo has been trying to rekindle interest in renewed funding for joint Arab projects. [redacted]

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but the Ministry of Defense is working to extend its range to at least 60 kilometers. [REDACTED]

While expanding its capabilities to produce small missiles and rockets, we believe Egypt has been gradually acquiring some of the technology, expertise, and facilities it will need to manufacture surface-to-surface ballistic missiles:

- The Egyptians probably have sufficient capacity and the work force to increase production of ballistic missiles at their Sakr Factory (and the nearby [REDACTED])

[REDACTED] development, is well equipped with modern Western machinery and is generally well managed.

- The Egyptians have established a "Space Research Center" in the Cairo area with assistance and technology from a West German firm, Messerschmitt-Boelkow-Blohm, [REDACTED]. The center will be used to improve guidance systems for surface-to-air missiles, but we believe some facilities within the center or nearby will support work on inertial navigation systems and components used in ballistic missile production. [REDACTED]

- Egypt is continuing efforts to expand its solid-rocket-propellant manufacturing capacity at its Abu Za'bal chemical factory. With assistance from a West German firm in 1979, the factory probably [REDACTED]

gained the capability to manufacture composite propellants that could be used in rocket motors. [REDACTED]

[REDACTED] in August 1987, Cairo expected to obtain a 300-gallon propellant mixer from a West German firm that will enhance Egypt's propellant production capabilities (the mixer will enable Egypt to produce at one time enough propellant to load a 2,000-kilogram solid-rocket motor or several smaller motors). The Egyptians also are seeking West European assistance to expand their facilities for producing ammonium perchlorate, a key solid-propellant ingredient, and to improve their ammonium perchlorate grinding technology in order to reduce Egypt's dependence on external suppliers of solid-propellant ingredients.

- Between 1984 and 1985, Egypt acquired a static-firing rocket test facility and calibration laboratory from a French company and, with French assistance, gained the capability to manufacture large rocket motors. [REDACTED]

#### Development Program

We believe responsibility for surface-to-surface missile development continues to rest with the military, [REDACTED]

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**Facilities Related to Missile Production**

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[redacted] the following facilities are in some way related to surface-to-surface ballistic missile development and production in Egypt:

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- **Sakr Factory for Developed Industries** (formerly Factory 333). The Egyptians carry out most of their missile development and production at this factory, located in the Almaza section of northeast Cairo.

- **Abu Za'bal Company for Specialized Chemicals.** We believe the Egyptians are manufacturing solid fuel for rocket motors at this facility and testing rocket motors. [redacted]

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[redacted]  
clean and well equipped with machines from West Germany, France, the United Kingdom, the United States, and Switzerland and has a work force of about 5,000 people. The Sakr Factory produces a variety of rockets and missiles including RPG-7 antitank rockets, Hosam antitank handgrenades, 122-mm artillery rockets, trainer flying target rockets, smoke generating rockets, 122-mm illuminating rockets, Sakr-eye surface-to-air missiles (reverse-engineered SA-7s), and the Sakr-80 rocket (FROG-like weapon). We believe development of Egypt's Condor II/Vector also is under way at the Sakr Factory, probably in one of the newer buildings.

- **Jabal al Hamzah Range.** The Egyptians probably conduct most of their surface-to-surface ballistic missile tests at this range. It is located northwest of Cairo. The Sakr Factory also uses the range to test other munitions.

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- **Arab-British Dynamics Company.** This facility is also part of the Arab Organization for Industrialization and is located in the Sakr Factory compound adjacent to Sakr facilities. The Egyptians have used the factory to produce British-designed, 1960s-generation Swingfire antitank guided missiles. [redacted]

- **Egyptian Space Research Center.** We believe part of the center may house surface-to-surface ballistic missile-related equipment. [redacted]

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Many of the details of Egypt's missile development program are unclear, but, [redacted] we believe the Ministry of Defense is developing at least two surface-to-surface ballistic missiles for Egyptian forces and to sell abroad. In the next one to five years we expect Egypt to produce versions of Scud missiles and a longer range missile system similar to Argentina's Condor II missile currently under development. The Egyptians cannot manufacture entire Scud or Condor systems independently, however, and are involved in coproduction projects with North Korea and Argentina, respectively. [redacted]

#### Scud Project

The Ministry of Defense, we believe, has been working with North Korea since the early 1980s on a project to produce in Egypt missiles similar to Soviet Scuds. [redacted] Cairo provided Scuds to North Korea in 1983 for reverse-engineering, most likely in exchange for North Korean promises to assist in production of Scuds in Egypt. We believe the Egyptians are paying P'yongyang a considerable sum for its assistance. [redacted]

[redacted] the Ministry of Defense was negotiating a license to manufacture North Korean Scuds in 1986, and North Korean and Egyptian officials signed an

[redacted] agreement in December 1987 for the transfer of missile technology—probably for Scuds—to Egypt. [redacted] the North Koreans expect to receive some of the Egyptian missiles as part of the agreement, but the deal may only call for additional royalty payments on Egyptian-produced Scuds. [redacted]

[redacted] the Scud project—[redacted]

[redacted] consists of several phases. During the first phase, Egypt was to conduct a range test of a missile assembled in North Korea. The intermediate stage involves moving to Egyptian assembly and testing of Scud—"kits" provided by North Korea and developing the tooling and infrastructure that would enable Egypt to manufacture all components. During the last part of the program, Egypt is to begin series production of the missiles with little or no North Korean assistance. [redacted]

We believe the Egyptians have reached the intermediate phase of the project—building missiles from kits and testing them. [redacted]

Egyptian military officers spent some 18 months in North Korea during the period 1984-85 conducting research and receiving training on the Scud system. [redacted]

[redacted] by September 1986, the Egyptians and North Koreans were assembling missiles—probably prototypes—in Egypt.<sup>6</sup> The Egyptians apparently made more progress in 1987. [redacted]

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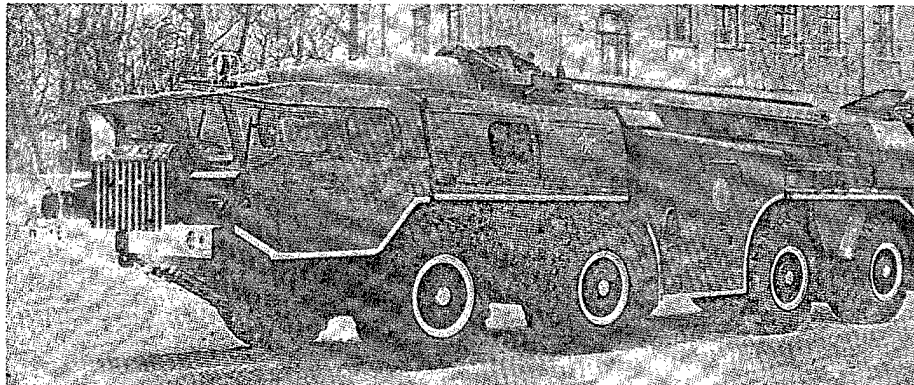
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Figure 6. Scud missile system.



probably manufactured with North Korean assistance from kits, at their Jabal al Hamzah test range. [REDACTED]

We do not know the specifications of the North Korean-Egyptian Scud-like missile, but the North Koreans probably have made few if any modifications to the Soviet system. [REDACTED]

[REDACTED] the missiles tested in Egypt were similar in maximum range—about 300 kilometers—[REDACTED]

[REDACTED] Nonetheless, we cannot rule out Egyptian attempts to alter the missile, possibly using technology acquired from the West or from Iraq, to achieve greater range and accuracy and perhaps to carry a different payload. [REDACTED]

[REDACTED] Egypt in 1986 was exploring possibilities that might lead to production of a 600-kilometer-range system. [REDACTED]

#### Condor II/Vector Project

The office of special projects is working with Argentina and West European firms to develop a new surface-to-surface missile. [REDACTED]

[REDACTED] the Egyptians began participating in

Argentina's Condor II project—an effort to develop a two-stage, short-range ballistic missile system—as early as 1983.' We do not know the specifics of the Argentine-Egyptian cooperation agreement, but we believe Cairo is helping to fund the program and is assisting directly in coproducing the system. Egyptian military technicians have been working with Argentine engineers at Argentina's Cordoba facility since about 1984. [REDACTED]

[REDACTED] Both countries are working closely with West European firms from which they are receiving technology for the missile subsystems. [REDACTED]

Cairo may buy a small number of missiles and key components in the short term, but the Ministry of Defense probably expects to gain full production technology for the Condor II system by the early 1990s through cooperation with Argentina. The office of special projects is sponsoring a separate development and production program in Egypt for a missile similar or identical to Argentina's Condor II. [REDACTED]

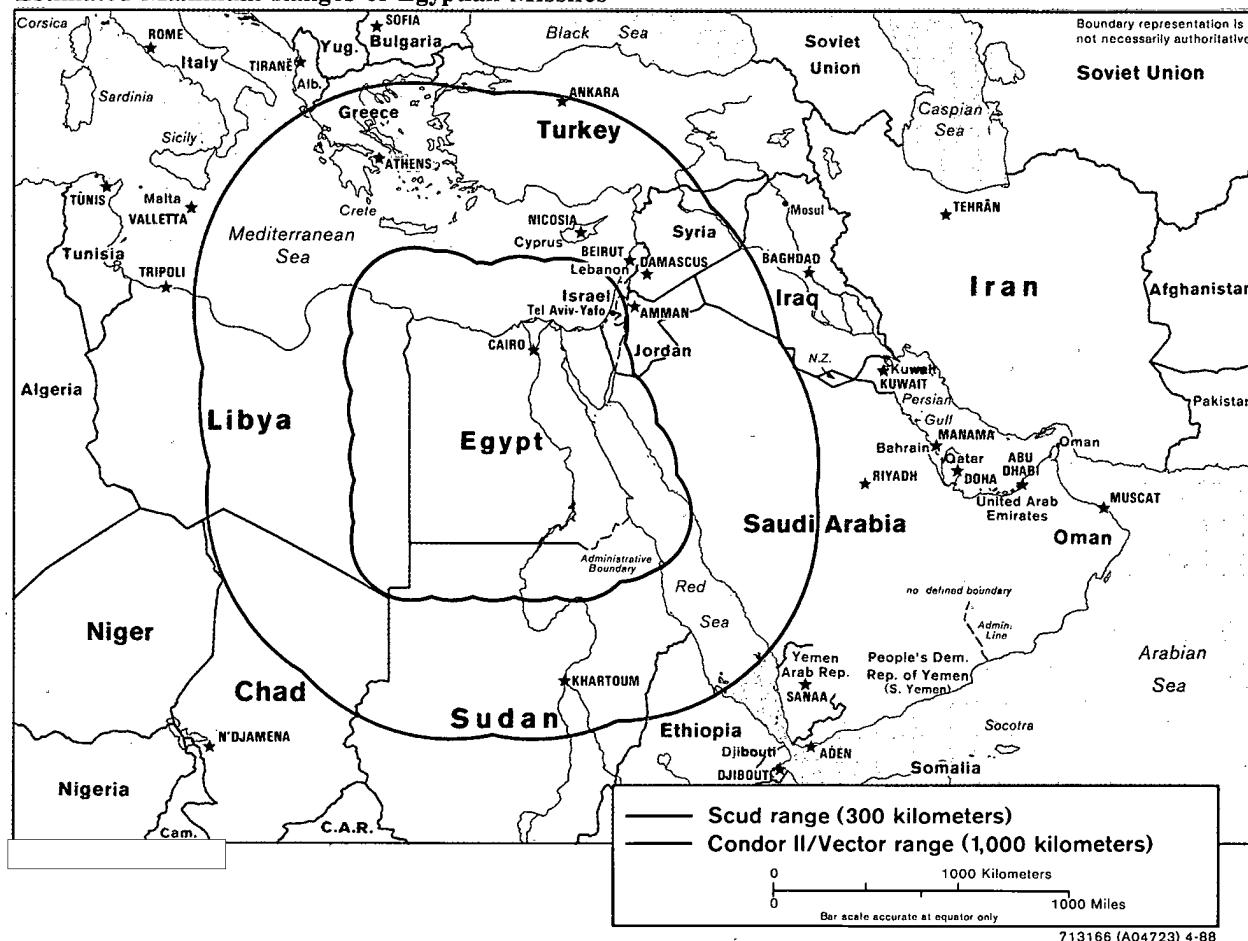
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**Figure 9**  
**Estimated Maximum Ranges of Egyptian Missiles**



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### Dependence on Foreign Assistance

Foreign technology and material assistance are critical to Egypt's missile program. Cairo, in our view, lacks sufficient technical expertise—especially in propulsion systems, rocket-motor production, and guidance and control—to produce surface-to-surface missiles like the Scud and the Condor independently. In particular, the Egyptians cannot manufacture in sufficient quality and quantity many of the materials needed for Condor production, including ammonium perchlorate for solid propellants and probably the special steel needed for motor cases. Cairo has acquired or will soon obtain most of the equipment, technology, and materials to produce Scuds, but,

given Egypt's poor performance in other military production efforts, we suspect that assembly of such missiles would quickly stop without North Korean technical assistance. The North Koreans must help the Egyptians overcome even minor difficulties and assure quality control. [REDACTED]

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Cairo also depends on foreign financial assistance to continue its missile program. Even though the Ministry of Defense pays for part of the program [REDACTED] it probably cannot cover all costs, especially with other military programs competing for funds. We suspect that most of the missile program is

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supported by Iraqi payments and perhaps transfers from Saudi Arabia either directly or through Iraq.

### Outlook

Cairo is likely to continue making surface-to-surface ballistic missile development a high priority. The military's progress with the Scud and Condor II/Vector projects will sustain high-level support for missile development, in our view. Moreover, the acquisition of new or more missiles by other Middle Eastern states—such as the Saudis' purchase of CSS-2 intermediate-range ballistic missiles from China—may cause the Egyptians to try to accelerate or expand their program, though they probably would need additional foreign support.

The military appears more likely to succeed in the near term with its Scud production efforts than with its Condor II/Vector project. Series production of Scud-like missiles in Egypt could begin late next year if North Korea provides assistance and kits or most of the parts for assembly. Egypt probably cannot produce the entire missile independently before the early 1990s.

we believe Cairo could receive the necessary assistance from Western firms involved in Egypt's other missile projects or possibly from Iraq.

We believe Egypt could begin series production of Vector missiles by the early to middle 1990s. Access to Western technology and systems, such as the thrust-vector control for guidance, has advanced Argentine and Egyptian progress over the past 18 months on the Condor II. Full-scale production of that system in Argentina may begin by 1990, and we would expect to see additional technology and component transfers to Egypt shortly thereafter that would enable Cairo to begin producing Vector missiles within two years. Argentina's and Egypt's continued uncertainty about the missile's second stage and reliance on Western firms for parts and technology may slow development and production efforts.

### Implications for the Region and the United States

Possession of more Scuds and of Condor II/Vector surface-to-surface missiles, in our view, will substantially enhance Egypt's capability to deter and retaliate against enemy attacks:

- Additional secure supplies of Scud missiles—particularly if Egypt's inventory is larger than that of its opponent—may increase Cairo's willingness to use the weapons in response to military threats. Larger numbers of the missiles would increase the Egyptians' chances of hitting specific targets, since many missiles often must be used to compensate for their inaccuracy. The range of the Scud would allow Cairo to hit targets in Israel as well as Israeli troop concentrations in the Sinai. Most important targets in Libya and Sudan, however, would remain out of range.

- If Cairo obtains the Condor II/Vector, it will have a longer range surface-to-surface missile than those held by other Arab states. The Condor II/Vector would put many targets in the Middle East and Africa within range, including those in northern Chad, northern Sudan (including Khartoum), southern Syria (including Damascus), and western Libya (including about half of Libya's ground forces and some Libyan oilfields).

Cairo almost certainly would use the missiles in the event of another war to try to achieve tactical aims. It also might use such weapons against enemy strategic targets—civilian and economic facilities—but probably only in retaliation for similar attacks against Egypt or to avoid defeat. In the case of another war with Israel, Cairo probably would be especially reluctant to escalate the conflict by initiating missile strikes against strategic targets for fear of devastating Israeli reprisals.

Egypt's acquisition of additional Scuds and Condor II/Vectors will contribute to and probably accelerate the proliferation of surface-to-surface missiles and missile production efforts in the region.

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[redacted]  
Iraq's acquisition—probably by altering a Scud—of the Al-Husayn missile already have weakened constraints on the proliferation of missiles with ranges greater than 300 kilometers. Libya and Syria, in particular, would want to hasten their missile development programs to keep pace with other states in the Middle East. Meanwhile, Cairo eventually will sell Scuds and Condor II/Vectors to Baghdad while Iraq completes its own missile-production facilities. We cannot rule out sales of the Egyptian missiles to other countries, including the Arab Gulf states and Pakistan, possibly giving Islamabad a delivery vehicle for nuclear weapons. [redacted]

The Israelis [redacted]  
[redacted] will continue to be concerned about Egyptian capabilities and the likely spread of missile systems and production technology to other Arab countries, especially Iraq. [redacted]

[redacted]  
[redacted] Tel Aviv could respond

to Egyptian advances in missile production by speeding its own ballistic missile research and development efforts as well as urging the United States to increase its efforts to help halt the proliferation of such Arab missiles. [redacted]

US efforts to curtail transfers of missile-related technology and raw materials to Egypt probably would slow but not halt Cairo's missile program. Unless more countries support the Missile Technology Control Regime and those countries in the Regime enforce its restrictions more rigorously, Cairo will continue to find firms or countries—such as North Korea and possibly China—that will be willing to provide support.<sup>8</sup> A direct US confrontation of Egypt with evidence of its involvement in missile development probably would result in Egyptian denials, temporarily strained relations with Cairo, and a brief slowing of the program to increase security and tighten access to information on the program's progress. [redacted]

<sup>8</sup> The Missile Technology Control Regime was announced by the United States and Canada, France, West Germany, Italy, Japan, and the United Kingdom in April 1987. It attempts to halt the transfer of ballistic missile technology to potential nuclear proliferants. [redacted]

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